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A study of the validity and reliability of the Lowry Reasoning Test Combination in grades five, six, and seven

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A STUDY OF THE VALIDITY AND RELIABILITY OF THE LOWRY REASONING TEST COMBINATION IN GRADES FIVE, SIX, AND SEVEN

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by

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APPROVAL SHEET

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CHAPTER I

INTRODUCTION

Elementary school teachers, including many with whom the investigator has taught, have expressed a need for a group intelligence test that is easily administered and scored, easily interpreted, inexpensive, and relatively free of social status bias. The teachers have expressed a need for the best possible intelligence test that will assist them in predicting the success of the students in their future education in order to furnish for each individual student the best possible opportunity for growth and development. The investigator has noted an increasing trend toward placing children in class sections according to their relative potential abilities.

Wechsler has noted a serious concern by those working with intelligence tests about possible unfairness of the tests for children in different socio-economic groups.[1] Davis and Eells, Bray, Hess, and others have found that the intelligence tests now in use reflect a middle-class and upper-class

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[1]David Wechsler, "Measuring the I.Q. Tests," New York Times Magazine, January 20, 1957, p. 66.

culture.[2] Therefore, any aspect of a test which would tend to bias the assessment of a student's true potential, should in the estimation of the investigator be controlled as far as plausible.

Dr. Ellsworth Lowery constructed a battery of tests which he considered to be a valid measure for estimating some phases of intellectual functioning.

The results of a study by Farley indicate that the Lowry Reasoning Test Combination is relatively uninfluenced by social status.[3] R. Burnette found the Lowry Reasoning Test Combination to be an effective instrument for estimating some phases of intellectual functioning with 140 seventh-grade students, correlating .64 with the California Test of Mental Maturity and .59 with the students' Grade Point Averages while the California Test of Mental Maturity correlated .49 with the Grade Point Averages. The Lowry Reasoning Test Combination was found to be relatively free from sex role bias and social status bias when used with seventh-grade students.

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[2]A. Davis and K. Eells, Davis-Eells Tests of General Intelligence or Problem Solving Ability Yonkers, New York: World Book Company, 1952, p. 142; D. W. Bray, Issues in the Study of Talent New York: Kings Crown Press, 1954, p. 30; R. D. Hess, Journal of Educational Research, 49:53-58, 1955.

[3]John A. Farley, "A Study of the Lowry Reasoning Test as a Status Free Technique" (unpublished Master's thesis, Richmond Professional Institute of the College of William and Mary, 1956), p. 38.

The California Test of Mental Maturity purportedly employing only status free concepts correlated .25 with social status while the Lowry Reasoning Test Combination correlated .18 with social status.[4] This present investigation will attempt to analyze the validity and reliability of the test with fifth-, sixth, and seventh-grade students.

The Lowry Reasoning Test Combination was designed as an index of some phases of intellectual function employing symbols common to all status groups. The test has two subtests.

Lowry Reasoning Test A employs the days of the week in various combinations as the stimulus materials. It contains 25 questions stated in simple words, designed to progress in difficulty while the symbols remain the same. (Appendix A)

Lowry Reasoning Test B employs squares made by lines which represent match sticks. It contains 25 questions which also were designed to progress in difficulty while maintaining the verbal elements and graphic materials constant. Here also increased difficulty is obtained through varying the complexity of the designs and tasks while the difficulty of the symbols remains constant. (Appendix B)

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[4]Richard R. Burnette, "The Lowry Reasoning Test Combination in Relation to Sex Role and Social Status of Adolescents" (unpublished Master's thesis, Richmond Professional Institute of the College of William and Mary, 1957), p. 56.

The California Short-Form Test of Mental Maturity was designed to provide a diagnostic profile of the mental abilities comprising general intelligence.[5] The seven subtests give scores in four components: spatial relations, logical reasoning, numerical reasoning, and verbal concepts.[6] The test yields both mental ages and intelligence quotients for the language and non language sections and for the total test.

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[5]California Test Bureau, California Test of Mental Maturity (Summary of Investigations No. 3, Los Angeles, California, 1956), p. 5.

[6]Ibid., p. 9

CHAPTER II

PROCEDURES

I. STANDARDIZING INSTRUCTIONS FOR ADMINISTRATION OF THE LOWRY REASONING TEST COMBINATION

Standardized instructions for administration of the Lowry Reasoning Test Combination were established by Farley, R. Burnette, and the present investigator (Appendix C).

II. ADMINISTRATION OF THE LOWRY REASONING TEST COMBINATION AND THE CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY

The Lowry Reasoning Test Combination, hereafter called the Lowry, was administered by the classroom teachers from one suburban elementary school in eastern Virginia to five (5) fifth-, six (6) sixth-, and six (6) seventh-grade classes, on November 18 through November 20, 1957. Lowry Subtest A, hereafter called LRA, was administered first to half of the classes on each grade level and Lowry Subtest B, hereafter called LRB, was administered first to half of the classes on each grade level. The tests were administered in the morning.

Three months later, one half of the students in each grade were retested with the Lowry to furnish data for a test of reliability. One fifth-grade class, one and one-half sixth-

grade classes, and one and one-half seventh-grade classes which had taken LRA first in the fall were retested. A like number of classes which had taken LRB first in the fall were retested. The subtests were administered in the morning in the same order as in the fall. The tests were administered by the classroom teachers on February 18 through February 20, 1958. At this time one fifth-grade teacher requested that her class be withdrawn from the research.

Six months after the first tests were administered, the remaining students, one fifth-grade class, one and one-half sixth-grade classes, and one and one-half seventh-grade classes which had taken LRA first in the fall and a like number of classes which had taken LRB first in the fall were retested. The subtests were administered in the morning by the classroom teachers on May 19 through May 21, 1958.

Scores on the California Short-Form Test of Mental Maturity hereafter called CTMM, given in the fall to all seventh-grade students by their teachers as part of a county-wide testing program, were recorded for the Language (CL), Non-Language (CNL), and Total scores (CT). The CTMM was purchased by the investigator for the fifth- and sixth-grade students and administered to them by their teachers. Scores were recorded in the same manner as for the seventh-grade students.

64 boys and 54 girls in grade five, 65 boys and 84 girls in grade six, and 65 boys and 80 girls in grade seven

were present on each of the days the tests were administered, thus comprising the total sample.

Grades in reading, English, arithmetic, and social studies were recorded from the students' report cards for the first three-fourths of the school year. These subjects were common to the total group. Grade Point Averages (GPA) were derived from the sum of the four grades weighted in the following manner, excellent-four, satisfactory-three, fair-two, and unsatisfactory-one. The range for GPA would be from four, for a student with all unsatisfactory grades in these subjects, to 16, for a student with all excellent grades in these subjects.

III. TREATMENT OF DATA

Means were computed for all indices, with the data maintained separately for sex, grade, order of presentation of the Lowry, and time interval of the Lowry retests.

Correlations were computed between the following variables to test their grade point prediction: LRA-GPA, LRB-GPA, the Lowry total (LRC)-GPA, CL-GPA, CNL-GPA, and CT-GPA. A correlation was also computed between LRC and CT to explore the possibility of their measuring to some extent the same function.

Reliability was tested using the Test-Retest Method, by computing correlations between LRA-LRA_3, LRA-LRA_6, LRB-LRB_3, LRB-LRB_6, LRC-LRC_3, and LRC-LRC_6. All students' three

months or six months retests were matched to their original Lowry scores, thus dividing each grade into two different groups, those who took the three months retests and those who took the six months retests.

All correlations used in this study were computed using the Pearson Product Moment Method.

To test the results of the order of presentation of the Lowry Subtests, a t test was used to compute the significance of the differences between the means of the following sets of data with data maintained separately for each grade and sex: ab*LRA-baLRA; abLRB-baLRB; and abLRC-baLRC.

* Small letters indicate order of presentation.

CHAPTER III

RESULTS

Table I presents the arithmetic means of the various indices for boys, girls, and total of each grade and also affords a comparison between mean scores on the Lowry and their corresponding three or six months retests.

In grade five a comparison of means indicates no significant sex differences with the Lowry. The means were higher for LRB than for LRA.

In grade six there were the same findings as to sex differences with the Lowry as in grade five, except for the mean of LRA for the sixth-grade boys taking a six months retest, which was slightly higher than the mean of LRB. There was a small increase in the total mean of the Lowry from grade five to grade six.

In grade seven the Lowry again showed no apparent sex differences. There was a larger increase in the mean of LRC from grade six to grade seven, than from grade five to grade six.

The mean of CT for boys and girls in each of the grades would indicate that these students were normal in intelligence as it is measured by the CTMM, as they very closely approximated the average of 100.

The mean GPA for the boys and for the girls showed no significant variation from one grade to another. However,

TABLE I

ARITHMETIC MEANS OF THE LOWRY REASONING TEST COMBINATION, THE CALIFORNIA TEST OF MENTAL MATURITY, AND GRADE POINT AVERAGES FOR BOYS, GIRLS, AND TOTAL OF GRADES FIVE, SIX, AND SEVEN

	Grade 5			Grade 6			Grade 7		
N=	Boys 64	Girls 54	Total 118	Boys 65	Girls 84	Total 149	Boys 65	Girls 80	Total 145
LRA	6.58	7.02	6.78	7.31	7.13	7.21	8.80	8.90	8.86
LRB	7.63	7.67	7.64	7.92	8.06	8.00	10.37	10.61	10.50
LRC	14.20	14.69	14.42	15.23	15.19	15.21	19.17	19.51	19.36
CL	96.83	104.22	100.21	95.18	101.80	98.80	100.05	102.68	101.50
CNL	103.03	99.94	101.62	98.00	93.70	95.58	100.02	97.16	98.44
CT	100.22	102.28	101.16	96.69	97.76	97.30	100.18	100.78	100.51
GPA	9.98	11.06	10.47	9.52	10.96	10.34	9.32	11.51	10.53

THREE MONTHS LOWRY RETESTS

	Grade 5			Grade 6			Grade 7		
N=	Boys 27	Girls 29	Total 56	Boys 30	Girls 40	Total 70	Boys 31	Girls 43	Total 74
LRA	6.15	6.83	6.50	6.07	7.45	6.86	8.58	8.65	8.62
LRB	6.89	7.10	7.00	7.50	7.90	7.73	9.97	10.77	10.43
LRC	13.04	13.93	13.50	13.57	15.35	14.59	18.55	19.42	19.05
LRA_3	6.81	7.97	7.41	7.30	8.85	8.19	10.00	10.84	10.49
LRB_3	7.96	8.14	8.05	9.97	10.70	10.39	12.61	12.19	12.36
LRC_3	14.78	16.10	15.46	17.27	19.55	18.57	22.61	23.02	22.85

SIX MONTHS LOWRY RETESTS

	Grade 5			Grade 6			Grade 7		
	Boys 37	Girls 25	Total 62	Boys 35	Girls 44	Total 79	Boys 34	Girls 37	Total 71
LRA	6.89	7.24	7.03	8.37	6.84	7.52	9.00	9.19	9.10
LRB	8.16	8.32	8.23	8.29	8.20	8.24	10.74	10.43	10.58
LRC	15.05	15.56	15.26	16.66	15.05	15.76	19.74	19.62	19.68
LRA_6	8.11	7.88	8.02	9.80	8.82	9.25	10.68	9.86	10.25
LRB_6	9.38	10.12	9.68	10.23	10.11	10.16	12.21	11.51	11.85
LRC_6	17.49	18.00	17.69	20.03	18.93	19.42	22.88	21.38	22.10

a difference is indicated within each grade in GPA, the girls consistently receiving the higher mean grade. This finding is not supported by corresponding higher mean scores by the girls on the CT or the Lowry, since these two indices show no sex differences.

A comparison of means of the CL and CNL between girls and boys does indicate that the boys score higher in all grades on the CNL and the girls score higher in all grades on the CL, while means of LRA and LRB indicate no sex differences in any of the three grades.

Table II presents the intercorrelations of the CTMM; the Lowry; and GPA for boys, girls, and total of grades five, six, and seven. All of the correlations in this table are statistically significant beyond the .01 level with the exception of the correlation of GPA and CNL for the seventh-grade boys which is significant beyond the .05 level.

There are no significant differences in the correlations between LRC and GPA or CT and GPA. Although there is some variance in the correlation between GPA and the subtests of these two indices, the differences do not appear to be significant.

In grade five there was no apparent sex difference with the Lowry or CTMM except for a higher correlation between GPA and LRB for the girls than for the boys.

In grade six there was a higher correlation between GPA and the various indices for the boys than for the girls.

TABLE II

INTERCORRELATIONS OF THE CALIFORNIA TEST OF MENTAL MATURITY, LOWRY REASONING TEST COMBINATION, AND GRADE POINT AVERAGES FOR BOYS, GIRLS, AND TOTAL OF GRADES FIVE, SIX, AND SEVEN

	GPA Grade 5			GPA Grade 6			GPA Grade 7		
N=	Boys 64	Girls 54	Total 118	Boys 65	Girls 84	Total 149	Boys 65	Girls 80	Total 145
LRA	.65	.55	.60	.55	.33	.41	.45	.53	.46
LRB	.39	.67	.52	.51	.39	.44	.53	.36	.42
LRC	.63	.67	.64	.63	.43	.51	.53	.55	.51
CL	.70	.66	.70	.71	.67	.70	.40	.56	.48
CNL	.45	.50	.45	.51	.31	.37	.27*	.39	.26
CT	.70	.73	.71	.67	.56	.60	.42	.58	.47
	Boys LRC	Girls LRC	Total LRC	Boys LRC	Girls LRC	Total LRC	Boys LRC	Girls LRC	Total LRC
CT	.62	.69	.65	.58	.57	.57	.59	.66	.62

* All correlations are significant above the .01 level with this single exception, significant at the .05 level.

In grade seven there was a higher correlation between GPA and LRB for the boys than for the girls and a higher correlation with the CTMM for girls than for boys.

The correlations between GPA and CL are higher in each grade than between GPA and CNL.

There is a high positive correlation between CT and LRC, with no apparent sex or grade difference.

Table III presents a study of reliability by intercorrelations of the Lowry and the three months or six months Lowry retests. All of the correlations in this table are statistically significant beyond the .01 level with the exceptions of the correlations of LRB and LRB_6 for grade five boys and grade six girls. These two correlations are significant beyond the .05 level.

In grade five most of the correlations indicate a high degree of reliability, with no apparent sex difference. The correlations are a little higher between the initial tests and three months retests than between the initial tests and six months retests.

In grade six the total correlations indicate a high degree of reliability with no apparent difference in the three months or six months retests. The boys had a higher correlation between the initial tests and six months retests than with the three months retests, the opposite being true with the sixth-grade girls.

In grade seven the total correlations seem to be

TABLE III

A STUDY OF RELIABILITY BY INTERCORRELATIONS OF THE LOWRY REASONING TEST COMBINATION AND THE THREE MONTHS OR SIX MONTHS LOWRY RETESTS

	Grade 5			Grade 6			Grade 7		
	Boys LRA	Boys LRB	Boys LRC	Boys LRA	Boys LRB	Boys LRC	Boys LRA	Boys LRB	Boys LRC
LRA_3	.79			.52			.77		
LRA_6	.74			.78			.64		
LRB_3		.67			.61			.60	
LRB_6		.43*			.64			.75	
LRC_3			.75			.64			.74
LRC_6			.73			.82			.76
	Girls LRA	Girls LRB	Girls LRB	Girls LRA	Girls LRB	Girls LRC	Girls LRA	Girls LRB	Girls LRC
LRA_3	.86			.82			.50		
LRA_6	.70			.47			.83		
LRB_3		.83			.70			.58	
LRB_6		.82			.38*			.52	
LRC_3			.90			.82			.64
LRC_6			.86			.55			.76
	Total LRA	Total LRB	Total LRC	Total LRA	Total LRB	Total LRC	Total LRA	Total LRB	Total LRC
LRA_3	.76			.70			.62		
LRA_6	.73			.64			.72		
LRB_3		.76			.67			.57	
LRB_6		.69			.52			.64	
LRC_3			.84			.77			.69
LRC_6			.78			.69			.75

* All correlations are significant above the .01 level with these two exceptions, significant at the .05 level.

highly significant and indicate no sex differences or differences in the correlations with the three months and six months retests.

Table IV presents the $\underline{t}$ scores testing the significance of the differences between the means of the two different orders of presentation of the Lowry Subtests. A significant difference at the .05 level was found for fifth-grade boys and girls on the LRA and LRC attributable to the order of presentation. There were no other significant differences found due to the order of presentation of the Lowry Subtests in the remainder of the fifth-grade means or in the sixth- or seventh-grades.

TABLE IV

t SCORES TESTING THE SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE MEANS OF THE TWO DIFFERENT ORDERS OF PRESENTATION OF THE LOWRY SUBTESTS

	Grade 5			Grade 6			Grade 7		
N=	Boys 23-41	Girls 22-32	Total 45-73	Boys 30-35	Girls 40-44	Total 70-79	Boys 37-28	Girls 36-44	Total 73-72
abLRA-baLRA	2.320*	2.260*	.143	.887	.896	1.270	.424	.520	.684
abLRB-baLRB	1.929	.943	.576	.323	.432	.529	.885	.140	.434
abLRC-baLRC	2.531*	2.166*	.397	.682	.761	1.033	.129	.422	.210

ARITHMETIC MEANS OF THE TWO DIFFERENT ORDERS OF PRESENTATION OF THE LOWRY SUBTESTS

	Grade 5			Grade 6			Grade 7		
N=	Boys 23	Girls 22	Total 45	Boys 30	Girls 40	Total 70	Boys 37	Girls 36	Total 73
abLRA	5.09	8.41	6.71	7.73	7.48	7.59	8.59	8.67	8.63
abLRB	6.48	8.32	7.38	8.10	8.23	8.17	10.68	10.56	10.62
abLRC	11.57	16.73	14.09	15.83	15.70	15.76	19.27	19.22	19.25
N=	Boys 41	Girls 32	Total 73	Boys 35	Girls 44	Total 79	Boys 28	Girls 44	Total 72
baLRA	7.41	6.06	6.82	6.94	6.82	6.87	9.07	9.09	9.08
baLRB	8.27	7.22	7.81	7.77	7.91	7.85	9.96	10.66	10.39
baLRC	15.68	13.28	14.63	14.71	14.73	14.72	19.04	19.75	19.47

* Sig at .05 level
** Small letters indicate order of presentation.

CHAPTER IV

DISCUSSION

The arithmetic means of the Lowry increased from grade five to grade six and from grade six to grade seven. This increase is supported by the ideas of Morgan, who states that the use of logical deductive thinking processes increases until the achievement of a mental age of about twelve years.[7]

No significant sex differences were found with the arithmetic means of the Lowry in grades five, six, or seven. R. Burnette found no appreciable sex differences with the Lowry with the seventh-grade students in his investigation.[8] However, in both the present investigation and in R. Burnette's study there was found an appreciable and constant difference between the sexes with both the CL and the CNL. The National Education Association of the United States has found that in intellectual traits, such as those measured by an abstract intelligence test, the two sexes in elementary school mani-

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[7] J. J. B. Morgan, Psychology New York: Farrar and Rhinehart Inc., 1941, p. 91.

[8] Richard R. Burnette, op. cit. p. 57.

fest about equal capacity.[9] This would tend to support the findings employing both subtests of the Lowry.

Although there is some variance in the correlation between GPA and the subtests of the Lowry and CTMM, there are no significant differences in the correlations between GPA and LRC or GPA and CT. This indicates that both tests are about equally capable of grade point prediction.

The total correlations of CT and LRC for grade five, .65, for grade six, .57, and for grade seven, .62 closely resemble the correlation of .64 for CT and LRC with the seventh-grade students in R. Burnette's investigation.[10] In order to compare the CTMM with other major group tests of intelligence, the Los Angeles City Schools administered five intelligence tests to 284 high school seniors. A correlation of .70 for the CT and Otis Quick Scoring Test, .70 for the CT and Terman-McNemar Test, .53 for the CT and Primary Mental Abilities Test, and .39 for the CT and Science Research Associates Non-Verbal Test were reported.[11]

The California Test Bureau has conducted no Test-Retest

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[9]National Education Association of the United States, "The Implications of Research for the Classroom Teacher" Washington, D. C. 1939, p. 71.

[10]Richard R. Burnette, op. cit. p. 56.

[11]California Test Bureau, op. cit. p. 7.

studies using the same level of the CTMM; however, they have found that the CTMM correlates as high with the Stanford-Binet as it correlates with itself on retests by different examiners using different levels of the same test. Two of these examiners, Sheldon and Manolakes, in an extensive study with 422 subjects concluded that the correlation between the CTMM Short Form and the Revised Form L of the Stanford-Binet would range from .629 to .757.[12]

The three months Lowry retests had a total correlation with the initial Lowry tests of .84 in the fifth-grade, .77 in the sixth-grade, and .69 in the seventh-grade. The six months Lowry retests had a total correlation with the initial tests of .78 in the fifth-grade, .69 in the sixth-grade, and .75 in the seventh-grade. These correlations are indicative of a high degree of reliability as assessed by the Test-Retest Method.

A significant difference was found at the .05 level for fifth-grade boys and girls on the LRA and LRC. This is seemingly attributable to the differences between the means of the two different orders of presentation of the Lowry Subtests. Since the remainder of the fifth-grade means and the sixth- and seventh-grades were not affected, the in-

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[12]Ibid., p. 6.

vestigator believes that the order of presentation of the Lowry Subtests should not be considered as a major factor influencing the test results.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

This study was designed to determine whether the Lowry Reasoning Test Combination (the Lowry), a technique for estimating some phases of intellectual function, is a valid and reliable instrument for use with fifth-, sixth-, and seventh-grade students.

A group of 412 students: 64 boys and 54 girls in grade five, 65 boys and 84 girls in grade six, and 65 boys and 80 girls in grade seven in an elementary school in eastern Virginia constituted the sample.

The following data were collected from each student: California Test of Mental Maturity (CTMM) scores, Grade Point Averages (GPA), initial Lowry scores, and scores on a three months or six months Lowry retest.

With the initial Lowry tests, Lowry Subtest A (LRA) was administered first to half of the classes on each grade level and Lowry Subtest B (LRB) was administered first to half of the classes on each grade level. One half of the students in each grade level were administered a three months Lowry retest and one half of the students in each grade level were administered a six months Lowry retest with the subtests administered in the same order as for the initial Lowry tests.

All tests were administered by the classroom teachers. Data were maintained separately for sex, grade, order of presentation of the Lowry, and time interval of the Lowry retests.

Correlations were computed between the following variables: LRA-GPA, LRB-GPA, the Lowry total (LRC)-GPA, California Language Section (CL)-GPA, California Non Language Section (CNL)-GPA, California Total (CT)-GPA, LRC-CT, LRA-LRA_3 (three months retests), LRA-LRA_6 (six months retests), LRB-LRB_3, LRB-LRB_6, LRC-LRC_3, and LRC-LRC_6. The significance of the differences between the means of the two different orders of presentation of the Lowry subtests was tested by the use of t scores.

II. CONCLUSIONS

There were no significant sex differences found with the Lowry in grades five, six, or seven. Correlations between GPA and LRC and GPA and CT showed no significant differences indicating that both tests are about equally capable of grade point prediction. The total correlations of CT and LRC suggest that the Lowry estimates to a considerable degree the same ability as does the CTMM. Using the Test-Retest Method, the Lowry was found to have as high a degree of reliability as the CTMM. The order of presentation of Lowry Subtests was not found to be a major factor influencing test results.

It is concluded from this study that the Lowry is a valid and reliable instrument as a group intelligence test

with fifth-, sixth-, and seventh-grade students. The Lowry would seem to merit further investigation because it can be more easily administered, scored, and interpreted than the CTMM. This investigation would be further supported since the Lowry is comparatively inexpensive and has been found to be relatively free of social status bias.

This investigator suggests than an item analysis be conducted to evaluate the individual items of the Lowry as they contribute to the whole. Extensive studies on an elementary and high school level would need to be conducted to establish norms. The test form also should be constructed to facilitate mechanical scoring.

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APPENDIX

APPENDIX A

LOWRY REASONING TEST A

DIRECTIONS: Each answer is a day of the week. Remember that Sunday is always the first day of the week. Write it "Sun."

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1. Sun. 2. Mon. 3. Tues. 4. Wed. 5. Thurs. 6. Fri. 7. Sat.

A. If today were Saturday, what would tomorrow be?.....(....)

B. If today were the first day of the week, what was yesterday?.....(....)

C. If yesterday were Saturday, what day is tomorrow?.....(....)

D. If today were Sunday, what was the day before yesterday?.....(....)

On the next two pages are some more questions like these.

1. Sun. 2. Mon. 3. Tues. 4. Wed. 5. Thurs. 6. Fri. 7. Sat.

1. If today were the third day of the week, the day after tomorrow will be what day? .....(....)

2. If the day before yesterday were Thursday, what day is today? .....(....)

3. If tomorrow were Sunday, what was the day before yesterday? .....(....)

4. If yesterday were the sixth day of the week, what will the day after tomorrow be? .....(....)

5. If the day after tomorrow were Tuesday, what was the day before yesterday? .....(....)

6. If the first day of the week came on Friday, instead of on Sunday, then what would be the last day of the week?(....)

7. If the first day of the week came on Friday, what would be the fourth day of the week? .....(....)

8. If the first day of the week came on Tuesday, and if today were the third day of the week, tomorrow will be what? .....(....)

9. If today were Monday, and if tomorrow were the first day of the week, what would be the last day of the week(....)

10. If today were Saturday, and if the day after tomorrow were the first day of the week, what would be the fourth day of the week? .....(....)

11. If today were Sunday, and if the day before yesterday were the first day of the week, what would one week from tomorrow be? .....(....)

12. If the days of the week were reversed, so that Sunday came before Saturday, Wednesday before Tuesday, etc. what would be the day after Friday? .....(....)

13. If the days were reversed, and if today were Saturday, what day was the day before yesterday? .....(....)

14. If the days were reversed, and if the day before yesterday were Tuesday, then what day is tomorrow? ....(....)

Turn the page and continue work.

1. Sun. 2. Mon. 3. Tues. 4. Wed. 5. Thurs. 6. Fri. 7. Sat.

15. If the days were reversed, and if the day after tomorrow were Monday, what was the day before yesterday? .(....)

16. If the days were reversed, and if the day before yesterday were Thursday, what will one week from the day after tomorrow be? .....(....)

17. If Wednesday were the first day of the week, and if the days were reversed, what day would be three days before the last day of the week? .....(....)

18. If the days were reversed, and if the third day of the week came on Wednesday, what would be the first day of the week? .....(....)

19. If the days were reversed, and if today were the first day of the week, and if the day after tomorrow were Thursday, then the first day of the week comes on what day? .....(....)

20. If the days were reversed, and if tomorrow were the first day of the week, and if yesterday were Saturday, what is today? .....(....)

21. If the days were reversed, and if the day before yesterday were Friday, the second day of the week, what will tomorrow be? .....(....)

22. If the days were reversed, and if the third day before Friday were the first day of the week, and if Christmas came on the sixth day of the week, Christmas would come on what day? .....(....)

23. If today were tomorrow, and if yesterday were Sunday, then one week from the day after tomorrow will be? ....(....)

24. If the days were reversed, and if today were Saturday, and if the day before yesterday were the sixth day of the week, then what would be the day before the first day of the week? .....(....)

25. If the odd days of the week came first, in order, then the even days, and if then the order were reversed, and if Monday were the first day of the week, what would be the fifth day of the week? .....(....)

Stop Here

APPENDIX B

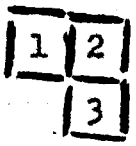
LOWRY REASONING TEST B

DIRECTIONS: The answer is always a number, or two or three numbers. If you cannot see how to do them, ask your teacher to help you with the first three, but no others.

A. Imagine the little squares at the left made with matches. How many matches must be removed so that the square numbered "1" will be entirely gone, but the other two squares will remain complete? .....(....)

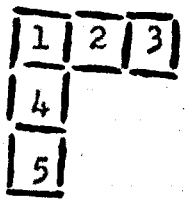
B. How many matches must be removed so that square number "2" will be gone leaving the other two complete? .....(....)

. By removing two matches, only, which square will be entirely gone, leaving two complete squares and nothing else? .....(....)



1. How many matches must be removed so that square number "2" will be eliminated - be entirely gone - leaving the other two complete? (....)

2. By removing two matches, only, which square can be eliminated? (....)



3. What two squares can be eliminated by removing three matches from each? (....)

4. What two squares can be eliminated by removing four matches, two from each, leaving three squares complete? (....)

5. Which square not included in question "4" can be eliminated by removing two matches? (....)

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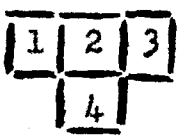
6. How many matches must be removed so that square number "2" will be eliminated, leaving the other three complete? (....)



7. With square number "2" eliminated, how many matches must be removed to eliminate square number "1"? (....)

8. When none of the squares are gone, which one can be eliminated by removing one match only? (....)

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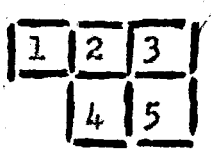
9. Which square can be eliminated by removing three matches? (....)

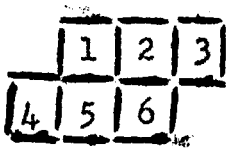
10. Which square can be eliminated by removing one match? (....)



11. What is the sum of the two squares that can be eliminated by removing three matches - not one for each - but three to eliminate the two squares? (....)

12. Which two squares can be eliminated by removing four matches? Add the answers to this question. What is the smallest answer you can get? (....)

(Turn the page and continue working)



13. What is the sum of the two answers to this question. Which square can be eliminated by removing two matches? (....)

14. What is the sum of the two squares that can be eliminated by removing two matches - that is -, one match for each square? (....)

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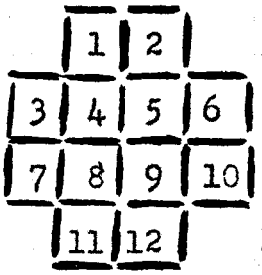
15. How many matches must you remove so that squares numbered "4", "5", "8", and "9" will be eliminated? (....)



16. How many correct answers can be given for this question - What squares can be eliminated by removing two matches? Do not give the answers, just the number of answers? (....)

17. How many correct answers can be given for this question? What two squares can be eliminated by removing one match? (....)

18. What is the smallest sum possible of two squares that can be eliminated by removing four matches? (....)

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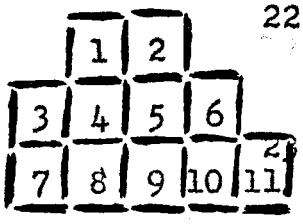
19. What is the sum of two squares that can be eliminated by removing one match? (....)

20. What is the smallest sum of two squares that can be eliminated by removing two matches? (....)

21. What is the largest sum of two squares that can be eliminated by removing two matches? (....)



22. What is the smallest sum of three squares that can be eliminated by removing two matches? (....)

23. What is the smallest sum of four squares that can be eliminated by removing four matches? (....)

24. What is the largest sum possible of three squares that can be eliminated by removing three matches? (....)

25. What is the smallest sum of three squares that can be eliminated by removing three matches? (....)

(STOP)

APPENDIX C

STANDARDIZED INSTRUCTIONS FOR ADMINISTRATION OF THE LOWRY REASONING TEST COMBINATION

This is a game to make you think. You will not get a grade. Try to do your best and solve as many of the problems as you can. Do not start until I give the signal and when I say, "Stop," everyone stop even if you are not finished.

On the front of the page you will see some practice questions. The directions say, "Each answer is a day of the week. Remember that Sunday is always the first day of the week. Write it 'Sun'," (L.R.A.) The directions say, "The answer is always a number, or two or three numbers. If you cannot see how to do them, ask your teacher to help you with the first three, but no others." (L.R.B.) Now do the practice questions. After sufficient time the answers are read and the examiner asks, "Are there any questions?" The examiner may show any student how to work only the practice questions. When sure everyone understands the practice questions, the examiner says, "On the pages that follow there will be more questions like these. Work as many as you can and do the best that you can."

Ready? Turn the page. Begin!

APPENDIX D

COMPLETE RAW DATA OF THE LOWRY REASONING TEST COMBINATION, THE THREE-MONTHS AND SIX-MONTHS LOWRY RETESTS, THE CALIFORNIA TEST OF MENTAL MATURITY, AND GRADE POINT AVERAGES

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
501	7	7	14	3	A	7	11	18	102	56	79	8
502	17	10	27	3	A	17	10	27	128	104	116	14
503	5	6	11	3	A	4	5	9	92	114	103	7
504	2	0	2	3	A	2	4	6	75	98	87	4
505	9	11	20	3	A	5	12	17	110	125	118	10
506	10	14	24	3	A	11	14	25	113	108	110	12
507	3	7	10	3	A	10	12	22	77	102	90	7
508	6	9	15	3	A	5	10	15	102	117	110	12
509	6	9	15	3	A	8	10	18	90	114	102	8
510	2	1	3	3	A	5	1	6	55	76	66	4
511	4	2	6	3	A	5	1	6	101	86	94	4
512	4	5	9	3	A	4	11	15	91	89	90	6
513	7	4	11	3	A	5	10	15	100	108	105	9
514	8	6	14	3	B	13	10	23	105	108	107	12
515	5	5	10	3	B	3	3	6	76	103	90	8
516	4	9	13	3	B	4	3	7	106	108	107	12
517	6	7	13	3	B	8	9	17	78	85	82	10
518	6	8	14	3	B	10	10	20	115	90	103	10
519	7	2	9	3	B	5	6	11	99	123	111	12
520	11	7	18	3	B	7	8	15	107	100	104	12
521	5	11	16	3	B	8	9	17	113	110	112	12
522	8	12	20	3	B	7	10	17	84	100	92	12
523	2	7	9	3	B	3	8	11	68	90	79	11
524	2	3	5	3	B	4	2	6	89	90	90	10
525	9	11	20	3	B	10	9	19	95	103	99	12
526	4	4	8	3	B	4	8	12	91	102	96	8
527	7	9	16	3	B	10	9	19	102	107	105	12
528	6	3	9	6	B	5	2	7	85	103	95	9
529	10	11	21	6	B	6	12	18	106	109	108	9
530	15	12	27	6	B	19	12	31	115	138	127	15
531	17	12	29	6	B	20	7	27	137	131	134	15
532	1	9	10	6	B	2	1	3	80	104	92	9
533	13	10	23	6	B	12	15	27	107	106	106	11
534	8	10	18	6	B	7	11	18	125	119	122	12
535	14	9	23	6	B	7	7	14	115	80	98	12
536	7	10	17	6	B	10	11	21	105	108	106	12
537	21	10	31	6	B	17	14	31	129	121	124	16
538	9	13	22	6	B	12	12	24	101	99	101	9
539	8	6	14	6	B	7	7	14	60	110	85	5
540	5	1	6	6	B	8	4	12	84	84	84	11

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
541	6	2	8	6	B	5	6	11	95	124	110	10
542	5	15	20	6	B	13	9	22	134	112	123	12
543	4	8	12	6	B	5	12	17	100	123	112	9
544	7	7	14	6	B	13	12	25	121	106	114	14
545	5	11	16	6	B	6	16	22	111	106	109	12
546	4	7	11	6	B	3	6	9	69	60	65	9
547	9	11	20	6	B	10	11	21	115	140	127	13
548	6	5	11	6	B	3	10	13	99	89	94	9
549	7	12	19	6	B	8	13	21	96	66	82	10
550	7	9	16	6	B	13	11	24	108	120	114	10
551	2	8	10	6	B	9	11	20	91	114	103	11
552	7	9	16	6	B	8	11	19	110	116	113	9
553	12	5	17	6	B	15	11	26	119	122	120	15
554	5	13	18	6	B	4	7	11	74	94	84	7
555	9	9	18	6	A	5	9	14	103	102	102	13
556	3	3	6	6	A	5	5	10	79	70	75	5
557	1	12	13	6	A	2	8	10	67	112	90	4
558	6	5	11	6	A	9	13	22	96	110	103	12
559	4	5	9	6	A	4	8	12	97	98	98	9
560	2	10	12	6	A	8	11	19	72	88	80	6
561	4	6	10	6	A	6	7	13	87	98	92	8
562	3	8	11	6	A	9	8	17	68	115	91	9
563	2	3	5	6	A	3	10	13	99	108	104	12
564	1	3	4	6	A	2	7	9	86	73	80	8
5001	8	10	18	3	A	11	7	18	116	104	110	12
5002	5	5	10	3	A	3	5	8	80	89	85	5
5003	6	2	8	3	A	4	7	11	99	82	91	8
5004	7	5	12	3	A	8	6	14	108	109	109	12
5005	4	6	10	3	A	5	3	8	90	92	91	8
5006	4	4	8	3	A	6	2	8	73	107	90	5
5007	9	9	18	3	A	10	12	22	114	114	114	14
5008	10	11	21	3	A	14	10	24	113	117	115	13
5009	3	2	5	3	A	2	1	3	82	68	75	4
5010	2	2	4	3	A	5	2	7	101	66	83	6
5011	17	21	38	3	A	20	16	36	120	126	123	15
5012	17	11	28	3	A	11	11	22	135	82	109	14
5013	15	11	26	3	A	12	13	25	109	115	112	11
5014	8	10	18	3	A	7	9	16	93	97	96	10
5015	10	11	21	3	A	10	13	23	108	117	112	13
5016	6	4	10	3	A	5	6	11	88	70	79	8
5017	3	8	11	3	B	6	8	14	102	114	108	12
5018	9	11	20	3	B	13	12	25	131	117	124	12
5019	8	9	17	3	B	10	10	20	99	79	89	12
5020	7	8	15	3	B	10	13	23	108	127	118	12

APPENDIX (continued)

CODE*	LRA	LRB	LRC	X**	Y***	RETEST LRA	RETEST LRB	RETEST LRC	CL	CNL	CT	GPA
5021	2	2	4	3	B	10	5	15	106	76	91	10
5022	5	7	12	3	B	5	9	14	109	90	100	12
5023	6	2	8	3	B	5	5	10	96	93	95	11
5024	3	4	7	3	B	4	8	12	79	87	83	12
5025	2	2	4	3	B	6	3	9	112	73	93	12
5026	7	8	15	3	B	11	11	22	134	113	123	12
5027	5	9	14	3	B	8	11	19	93	103	98	12
5028	6	2	8	3	B	3	7	10	88	107	97	10
5029	4	10	14	3	B	7	11	18	97	108	102	12
5030	7	10	17	6	B	14	12	26	109	131	120	15
5031	3	3	6	6	B	2	5	7	91	106	98	8
5032	5	0	5	6	B	6	5	11	72	96	85	6
5033	7	7	14	6	B	9	11	20	96	110	103	12
5034	7	9	16	6	B	6	10	16	108	128	118	14
5035	4	4	8	6	B	3	5	8	96	102	99	9
5036	9	8	17	6	B	15	11	26	133	90	112	13
5037	9	9	18	6	B	6	10	16	108	91	100	8
5038	5	8	13	6	B	6	10	16	113	107	110	12
5039	12	10	22	6	B	10	11	21	106	115	111	14
5040	11	8	19	6	B	9	13	22	146	111	129	12
5041	6	9	15	6	B	2	11	13	103	92	98	10
5042	1	10	11	6	B	4	9	13	95	78	87	12
5043	8	16	24	6	B	11	11	22	112	124	118	12
5044	9	13	22	6	B	10	14	24	125	113	120	16
5045	4	2	6	6	B	3	2	5	87	86	87	6
5046	9	9	18	6	B	9	11	20	114	84	99	12
5047	4	7	11	6	B	7	7	14	78	99	89	9
5048	7	7	14	6	B	12	10	22	111	105	108	11
5049	13	15	28	6	A	10	17	27	121	104	113	16
5050	11	9	20	6	A	13	13	26	107	80	94	13
5051	7	7	14	6	A	6	10	16	114	113	114	16
5052	4	7	11	6	A	3	10	13	89	95	92	8
5053	12	11	23	6	A	14	14	28	104	129	117	13
5054	7	10	17	6	A	7	11	18	107	66	87	11
601	6	9	15	6	A	5	7	12	91	60	75	8
602	10	16	26	6	A	14	13	27	119	106	113	12
603	8	3	11	6	A	14	9	23	105	112	108	8
604	6	8	14	6	A	9	4	13	106	78	92	6
605	9	13	22	6	A	13	12	25	130	121	125	10
606	8	4	12	6	A	11	11	22	101	91	96	9
607	10	1	11	6	A	9	1	10	103	89	96	7
608	14	11	25	6	A	11	16	27	106	100	103	11
609	11	16	27	6	A	13	15	28	128	120	124	16
610	12	12	24	6	A	16	17	33	122	120	121	12

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
611	4	13	17	6	A	7	13	20	93	135	114	8
612	11	7	18	6	A	9	12	21	87	96	92	9
613	6	2	8	6	A	8	11	19	99	97	98	12
614	4	3	7	6	A	7	2	9	64	77	71	4
615	16	18	34	6	A	17	14	31	130	137	133	15
616	6	8	14	6	A	10	7	17	77	79	78	4
617	11	11	22	6	A	15	11	26	124	130	127	12
618	6	10	16	3	A	6	10	16	83	102	92	11
619	3	5	8	3	A	4	4	8	77	79	78	5
620	9	3	12	3	A	11	2	13	90	105	98	12
621	8	4	12	3	A	2	1	3	17	38	28	5
622	4	5	9	3	A	4	10	14	94	83	89	10
623	4	1	5	3	A	5	11	16	83	83	83	7
624	6	6	12	3	A	8	11	19	91	108	100	8
625	10	9	19	3	A	7	14	21	103	99	101	13
626	7	7	14	3	A	10	12	22	91	84	88	10
627	7	10	17	3	A	7	11	18	115	92	104	13
628	4	10	14	3	A	7	10	17	88	112	100	9
629	7	8	15	3	A	10	12	22	114	76	95	11
630	5	10	15	3	A	9	14	23	98	73	86	8
631	3	7	10	3	B	9	10	19	97	102	100	10
632	4	8	12	3	B	1	10	11	80	98	89	8
633	11	10	21	3	B	9	11	20	89	118	104	8
634	9	14	23	3	B	8	12	20	85	87	86	11
635	4	9	13	3	B	10	11	21	99	110	104	12
636	13	10	23	3	B	19	11	30	101	85	93	9
637	3	6	9	3	B	8	10	18	88	92	90	11
638	6	10	16	3	B	5	12	17	102	107	105	9
639	9	7	16	3	B	12	11	23	119	124	121	9
640	2	3	5	3	B	3	7	10	92	91	92	9
641	5	11	16	3	B	7	9	16	75	83	79	5
642	6	10	16	3	B	8	13	21	85	101	93	11
643	6	10	16	6	B	9	10	19	84	67	76	8
644	6	6	12	6	B	9	14	23	99	124	112	13
645	12	14	26	6	B	16	17	33	111	75	93	15
646	11	11	22	6	B	12	12	24	109	116	112	13
647	14	6	20	6	B	16	10	26	114	108	112	12
648	15	12	27	6	B	11	15	26	107	138	123	13
649	11	11	22	6	B	9	14	23	113	108	110	15
650	2	2	4	6	B	4	7	11	94	70	82	10
651	9	1	10	6	B	6	12	18	95	104	99	9
652	5	10	15	6	B	10	12	22	97	106	101	10
653	11	11	22	6	B	10	7	17	90	101	96	11
654	2	5	7	6	B	3	5	8	58	85	72	4

APPENDIX (continued)

CODE*	LRA	LRB	LRC	X**	Y***	RETEST LRA	RETEST LRB	RETEST LRC	CL	CNL	CT	GPA
655	1	6	7	6	B	1	7	8	76	96	86	7
656	12	9	21	6	B	10	11	21	112	157	135	10
657	2	4	6	6	B	6	4	10	78	74	76	5
658	10	6	16	6	B	13	13	26	116	129	123	15
659	4	2	6	6	B	4	3	7	81	81	81	4
660	8	9	17	6	B	6	10	16	103	91	97	15
661	9	7	16	3	B	6	13	19	65	91	78	7
662	6	9	15	3	B	12	13	25	93	103	98	7
663	7	2	9	3	B	1	4	5	59	69	64	5
664	1	2	3	3	B	2	8	10	86	91	89	4
665	4	12	16	3	B	9	12	21	106	106	106	10
6001	8	7	15	6	A	14	18	32	110	103	107	14
6002	11	12	23	6	A	16	17	33	125	126	126	13
6003	7	13	20	6	A	10	12	22	125	102	114	15
6004	7	8	15	6	A	8	9	17	104	84	94	12
6005	4	9	13	6	A	4	9	13	84	67	76	8
6006	8	9	17	6	A	9	8	17	100	94	97	10
6007	13	12	25	6	A	11	11	22	104	81	93	10
6008	9	12	21	6	A	19	13	32	117	76	97	15
6009	6	7	13	6	A	7	10	17	111	95	103	8
6010	9	3	12	6	A	15	15	30	137	113	125	16
6011	9	10	19	6	A	7	10	17	112	98	105	9
6012	8	9	17	6	A	9	12	21	93	96	95	9
6013	11	10	21	3	A	11	12	23	114	126	120	16
6014	5	2	7	3	A	9	3	12	90	85	88	12
6015	5	6	11	3	A	6	2	8	23	60	42	6
6016	17	15	32	3	A	17	14	31	115	108	112	15
6017	5	6	11	3	A	7	14	21	99	93	96	12
6018	9	2	11	3	A	7	9	16	99	99	99	11
6019	3	6	9	3	A	7	8	15	101	88	94	12
6020	5	8	13	6	A	6	2	8	97	85	91	12
6021	10	10	20	6	A	9	11	20	111	107	109	12
6022	6	10	16	6	A	4	6	10	100	69	84	11
6023	6	1	7	6	A	8	12	20	94	101	97	12
6024	4	5	9	6	A	5	7	12	81	84	82	4
6025	3	9	12	6	A	4	9	13	86	99	93	10
6026	9	14	23	6	A	10	15	25	135	132	134	12
6027	6	4	10	3	A	7	8	15	88	77	83	10
6028	3	5	8	3	A	9	9	18	95	93	94	11
6029	2	8	10	3	A	8	14	22	95	69	82	9
6030	12	7	19	3	A	11	11	22	125	110	118	13
6031	8	12	20	3	A	11	16	27	121	85	103	14
6032	13	6	19	3	A	12	11	23	120	107	113	12
6033	6	11	17	3	A	7	10	17	126	102	114	16
6034	11	10	21	3	A	10	14	24	115	105	110	14

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
6035	6	10	16	3	A	7	14	21	107	107	107	13
6036	6	5	11	3	A	8	14	22	84	86	85	10
6037	4	8	12	3	A	7	14	21	107	62	84	14
6038	3	5	8	3	A	6	10	16	93	109	101	10
6039	9	10	19	3	A	14	14	28	124	82	103	12
6040	13	13	26	3	A	11	14	25	115	118	116	14
6041	8	11	19	3	B	11	13	24	120	99	110	10
6042	18	13	31	3	B	16	15	31	113	108	110	7
6043	10	7	17	3	B	12	11	23	113	110	111	12
6044	5	10	15	3	B	8	9	17	99	99	99	12
6045	7	9	16	3	B	9	12	21	97	99	98	11
6046	2	5	7	3	B	6	8	14	100	105	103	12
6047	8	7	15	3	B	6	12	18	99	70	84	12
6048	7	12	19	3	B	6	12	18	109	84	96	12
6049	7	11	18	3	B	10	18	28	105	106	106	13
6050	10	11	21	3	B	12	16	28	114	104	109	12
6051	5	4	9	3	B	7	3	10	71	65	68	9
6052	9	8	17	3	B	8	15	23	102	77	90	12
6053	14	11	25	3	B	18	12	30	134	117	126	11
6054	7	10	17	6	B	10	14	24	83	78	81	10
6055	2	9	11	6	B	11	12	23	108	81	95	13
6056	10	10	20	6	B	11	15	26	107	93	100	16
6057	8	11	19	6	B	9	13	22	106	93	99	15
6058	8	6	14	6	B	8	10	18	88	114	101	10
6059	3	3	6	6	B	11	8	19	99	94	97	11
6060	4	5	9	6	B	5	6	11	93	96	94	7
6061	7	3	10	6	B	12	10	22	80	87	84	7
6062	5	6	11	6	B	6	8	14	74	84	79	6
6063	5	5	10	6	B	3	12	15	108	88	98	16
6064	7	8	15	6	B	5	11	16	99	67	83	12
6065	5	2	7	6	B	2	5	7	90	74	82	8
6066	5	7	12	6	B	6	11	17	101	90	96	8
6067	5	9	14	6	B	6	2	8	95	89	92	12
6068	8	1	9	6	B	6	0	6	89	84	87	6
6069	9	10	19	6	B	9	13	22	118	102	110	15
6070	3	7	10	6	B	8	11	19	85	91	88	8
6071	2	9	11	6	B	5	6	11	90	85	88	11
6072	7	11	18	3	B	7	10	17	96	94	95	12
6073	4	5	9	3	B	4	1	5	57	88	73	4
6074	5	1	6	3	B	5	2	7	85	72	79	4
6075	8	7	15	3	B	6	12	18	133	131	132	12
6076	2	2	4	3	B	3	2	5	75	63	69	4
6077	5	10	15	3	B	8	10	18	80	98	89	4
6078	6	6	12	6	B	9	9	18	99	95	97	11
6079	10	10	20	6	B	11	11	22	118	109	114	11

APPENDIX (continued)

CODE*	LRA	LRB	LRC	X**	Y***	RETEST LRA	RETEST LRB	RETEST LRC	CL	CNL	CT	GPA
6080	3	11	14	6	B	18	11	29	108	116	112	14
6081	12	11	23	6	B	12	13	25	108	97	103	15
6082	6	9	15	6	B	9	8	17	96	124	110	8
6083	6	10	16	6	B	7	7	14	87	92	90	4
6084	13	15	28	6	B	14	13	27	121	76	99	14
701	13	5	18	6	B	17	11	28	101	105	103	9
702	9	6	15	6	B	11	8	19	107	118	112	9
703	5	8	13	6	B	8	6	14	123	102	115	6
704	7	9	16	6	B	7	9	16	84	83	83	5
705	13	14	27	6	B	8	13	21	111	114	113	10
706	13	16	29	6	B	14	14	28	116	111	114	11
707	7	8	15	6	B	6	10	16	100	95	98	6
708	7	9	16	6	B	12	13	25	100	112	105	6
709	10	10	20	6	B	6	13	19	117	90	106	8
710	14	14	28	6	B	11	17	28	107	121	113	13
711	14	13	27	3	B	15	15	30	107	73	100	12
712	15	9	24	3	B	13	10	23	106	110	108	10
713	2	8	10	3	B	7	9	16	99	109	103	8
714	7	10	17	3	B	13	15	28	90	108	97	7
715	9	13	22	3	B	13	13	26	113	113	113	5
716	11	9	20	3	B	10	14	24	115	93	107	7
717	3	2	5	3	B	5	3	8	81	96	87	7
718	4	6	10	3	B	5	8	13	97	98	97	4
719	8	6	14	3	B	9	12	21	89	92	90	6
720	10	11	21	3	B	5	1	6	98	97	97	4
721	5	11	16	3	B	6	11	17	94	95	94	9
722	5	8	13	3	B	9	10	19	86	86	86	6
723	3	9	12	6	B	4	11	15	93	86	91	9
724	11	11	22	6	B	12	12	24	102	94	100	13
725	10	11	21	6	B	10	11	21	97	92	95	7
726	10	13	23	6	B	11	15	26	106	103	104	10
727	6	11	17	6	B	10	10	20	87	105	94	5
728	23	19	42	6	B	22	19	41	123	104	115	10
729	6	10	16	6	A	8	9	17	88	79	84	10
730	4	10	14	6	A	9	13	22	88	99	92	8
731	2	2	4	6	A	10	2	12	88	95	91	4
732	8	9	17	6	A	8	13	21	82	96	88	8
733	12	11	23	6	A	7	13	20	96	80	90	11
734	13	15	28	6	A	15	14	29	121	100	113	13
735	3	7	10	6	A	16	10	26	84	113	96	8
736	9	13	22	6	A	11	13	24	87	91	88	11
737	18	16	34	6	A	16	13	29	121	117	119	13
738	13	13	26	6	A	15	14	29	113	109	112	13
739	6	10	16	6	A	7	16	23	113	85	103	12
740	8	11	19	3	A	13	15	28	97	110	103	16

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
741	14	15	29	3	A	17	17	34	120	105	118	10
742	10	10	20	3	A	11	17	28	99	107	99	12
743	11	10	21	3	A	10	10	20	103	100	101	12
744	12	13	25	3	A	11	13	24	99	103	101	12
745	3	8	11	3	A	4	10	14	74	77	75	8
746	7	8	15	6	A	8	7	15	90	101	94	7
747	4	12	16	6	A	8	14	22	90	110	97	9
748	5	9	14	6	A	10	14	24	66	84	73	9
749	8	11	19	6	A	11	16	27	113	103	109	13
750	8	12	20	6	A	13	15	28	108	117	112	12
751	15	13	28	6	A	13	13	26	115	110	113	12
752	4	11	15	6	A	9	14	23	107	102	106	11
753	10	9	19	3	A	13	18	31	90	88	89	4
754	10	9	19	3	A	10	15	25	113	109	111	12
755	3	7	10	3	A	5	10	15	82	89	85	4
756	7	13	20	3	A	10	21	31	88	99	92	11
757	9	14	23	3	A	12	13	25	102	101	101	11
758	4	9	13	3	A	10	13	23	91	92	91	11
759	5	12	17	3	A	9	17	26	110	100	106	8
760	14	10	24	3	A	11	15	26	97	88	94	12
761	14	10	24	3	A	13	13	26	101	115	107	12
762	10	12	22	3	A	13	15	28	107	96	102	12
763	20	15	35	3	A	18	18	36	100	123	110	12
764	3	10	13	3	A	7	11	18	112	111	111	12
765	6	6	12	3	A	3	9	12	99	92	96	9
7001	19	13	32	6	B	20	13	33	126	113	121	15
7002	12	9	21	6	B	15	11	26	119	103	114	12
7003	10	10	20	6	B	9	10	19	119	84	106	11
7004	5	4	9	6	B	9	11	20	77	87	83	12
7005	10	10	20	6	B	12	15	27	110	91	102	14
7006	4	11	15	6	B	3	12	15	96	96	96	9
7007	18	14	32	6	B	20	11	31	120	118	119	14
7008	10	10	20	6	B	11	14	25	78	95	84	12
7009	5	8	13	6	B	6	9	15	119	112	116	13
7010	12	8	20	6	B	9	16	25	115	116	115	13
7011	6	8	14	6	B	5	3	8	99	99	99	10
7012	19	17	36	6	B	19	18	37	119	113	116	14
7013	9	7	16	6	B	8	5	13	91	107	98	11
7014	6	10	16	6	B	12	15	27	100	98	99	15
7015	7	2	9	3	B	12	10	22	86	82	84	10
7016	9	11	20	3	B	12	12	24	89	97	92	11
7017	1	10	11	3	B	8	15	23	85	90	87	10
7018	11	15	26	3	B	17	13	30	129	85	116	12
7019	12	9	21	3	B	8	13	21	91	105	97	11

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
7020	8	16	24	3	B	13	15	28	114	100	109	13
7021	4	1	5	3	B	4	3	7	96	77	88	6
7022	11	14	25	3	B	19	15	34	106	91	101	12
7023	7	10	17	3	B	9	13	22	93	78	87	9
7024	4	14	18	3	B	3	3	6	77	103	93	9
7025	4	11	15	3	B	10	18	28	89	98	92	12
7026	9	13	22	3	B	11	9	20	95	97	96	13
7027	10	10	20	3	B	8	9	17	100	79	92	13
7028	4	12	16	3	B	12	15	27	115	105	112	13
7029	9	11	20	3	B	10	13	23	99	89	93	12
7030	8	8	16	3	B	9	9	18	101	91	97	9
7031	9	9	18	3	B	14	12	26	113	93	105	12
7032	6	11	17	3	B	15	10	25	88	90	89	11
7033	18	14	32	3	B	18	15	33	130	129	130	16
7034	7	10	17	3	B	12	13	25	109	106	108	12
7035	12	10	22	3	B	11	17	28	134	101	123	13
7036	10	19	29	3	B	9	18	27	101	102	102	13
7037	9	13	22	3	B	12	10	22	90	88	89	5
7038	10	10	20	3	B	11	10	21	106	94	101	10
7039	11	12	23	6	B	7	13	20	103	86	97	14
7040	8	15	23	6	B	8	16	24	86	103	94	12
7041	10	8	18	6	B	6	12	18	100	97	99	10
7042	7	8	15	6	B	12	12	24	115	96	108	15
7043	10	11	21	6	B	12	10	22	105	110	107	10
7044	10	13	23	6	B	11	14	25	101	107	103	11
7045	6	7	13	6	A	5	9	14	102	85	96	9
7046	4	7	11	6	A	3	5	8	86	88	87	5
7047	6	9	15	6	A	7	13	20	82	82	82	9
7048	11	12	23	6	A	8	8	16	108	83	99	12
7049	6	12	18	6	A	11	16	27	104	81	93	13
7050	9	12	21	6	A	10	10	20	100	113	105	12
7051	16	12	28	6	A	20	13	33	144	132	139	14
7052	11	12	23	6	A	6	12	18	98	95	97	15
7053	3	8	11	6	A	6	10	16	85	97	88	4
7054	7	11	18	6	A	6	9	15	99	87	95	9
7055	9	10	19	6	A	9	10	19	103	66	89	12
7056	9	9	18	6	A	11	11	22	97	79	90	9
7057	8	14	22	6	A	9	12	21	99	92	97	14
7058	6	14	20	6	A	8	13	21	113	105	110	12
7059	9	10	19	6	A	7	11	18	103	118	114	12
7060	15	12	27	6	A	18	16	34	129	116	125	16
7061	4	9	13	6	A	7	8	15	100	108	103	11
7062	8	10	18	3	A	11	13	24	96	104	99	12
7063	7	13	20	3	A	8	15	23	96	94	94	10

APPENDIX (continued)

						RETEST						
CODE*	LRA	LRB	LRC	X**	Y***	LRA	LRB	LRC	CL	CNL	CT	GPA
7064	14	9	23	3	A	11	12	23	132	97	119	16
7065	8	10	18	3	A	11	14	25	81	98	88	9
7066	9	10	19	3	A	15	12	27	97	98	97	10
7067	11	6	17	3	A	8	10	18	104	110	106	12
7068	8	9	17	3	A	11	14	25	105	99	102	11
7069	13	17	30	3	A	21	16	37	118	107	114	15
7070	13	14	27	3	A	10	19	29	109	109	109	11
7071	11	14	25	3	A	12	14	26	102	113	107	12
7072	8	10	18	3	A	9	17	26	82	104	90	11
7073	10	8	18	3	A	2	3	5	102	82	95	8
7074	5	12	17	3	A	9	14	23	108	86	100	12
7075	4	12	16	3	A	5	9	14	88	88	88	11
7076	8	10	18	3	A	10	12	22	103	76	93	12
7077	13	13	26	3	A	14	14	28	119	110	115	13
7078	8	9	17	3	A	9	8	17	90	89	89	12
7079	5	1	6	3	A	6	2	8	79	79	79	12
7080	10	13	23	3	A	17	16	33	117	102	110	10

* The numbers beginning with 5 are for fifth-grade students, 6 for sixth-grade students, and 7 for seventh-grade students. The hundredths are for boys and the thousandths are for girls.

** Column X is to designate a three months or six months retest.

*** Column Y is to designate the Lowry subtest administered first.